

Chapter 18

## **Cumulative Effects**

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## Chapter 18

# Cumulative Effects

## NEPA and CEQA Requirements

NEPA and CEQA both require lead agencies to evaluate a proposed undertaking's potential to contribute to cumulative effects or cumulative impacts in the project or program area. *Cumulative impact* refers to the combined effect of "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Sec. 15355). As defined by the State of California, cumulative impacts reflect

the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (CEQA Guidelines Sec. 15355[b]).

This is consistent with NEPA's use of the term. The President's Council on Environmental Quality (CEQ) further recognizes two categories of cumulative impacts: those that represent the additive effect of repeated activities taking place as part of a single proposed undertaking, and those that represent the combined effect of activities taking place under more than one proposed undertaking.

CEQA requires that an EIR analyze a proposed undertaking's contribution to a cumulative impact when that contribution would be *cumulatively considerable*, meaning that it is considerable (significant) when viewed in connection with the effects of other past, current, and probable future projects (CEQA Guidelines Sec. 15130[a], 15065[c]). This ensures that EIRs fully analyze any project effects that are less than significant on an incremental (project-specific) scale, but may be considerable in combination with the related effects of other projects. It also serves to focus EIR analysis only on those cumulative impacts to which a proposed undertaking has the potential to make an important contribution. CEQ similarly guides lead agencies to restrict analysis of cumulative impacts to those that are meaningful.

In practice, this typically means that the lead agency identifies past, current, and foreseeable projects and programs related to the undertaking being analyzed and

evaluates their combined (cumulative) effects on the environment. If any cumulative impacts are identified as significant, the lead agency must then assess the degree to which the proposed undertaking would contribute to those impacts, and identify ways of avoiding or reducing any contribution evaluated as “cumulatively considerable” (CEQA Guidelines Sec. 15130[b]). Under CEQA, lead agencies may use a “list” approach to identify related projects for analysis, or may base the identification of cumulative impacts on a summary of projections in an adopted general plan or related planning document. CEQ’s guidance for cumulative impact analysis offers additional strategies to identify cumulative impacts requiring analysis, such as input from questionnaires, interviews, and panels; use of analytical tools such as checklists, matrices, and system diagrams; modeling and trends analysis; and, for resources where spatial relationships are important, GIS analysis.

## Approach and Scope

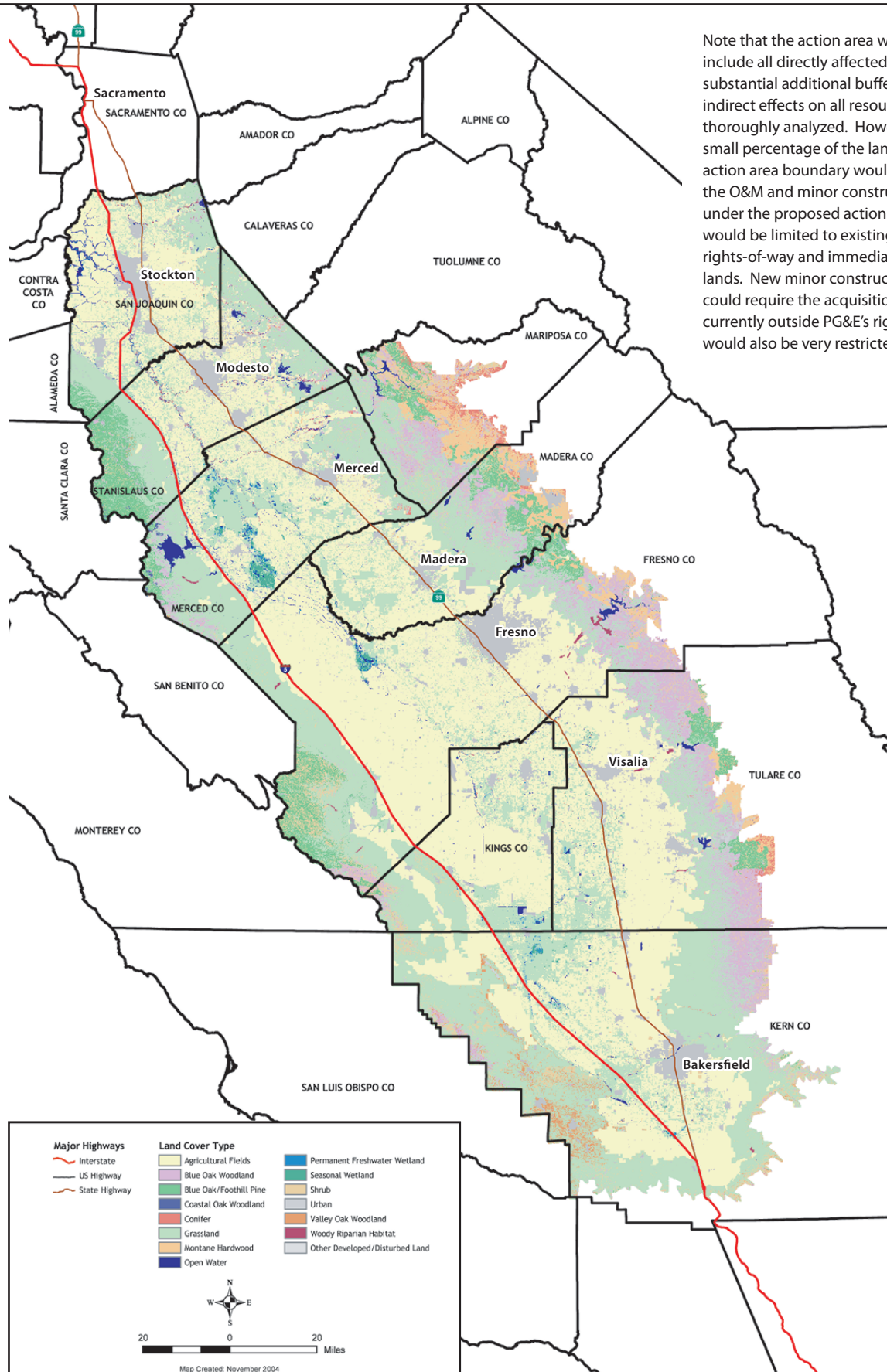
This analysis used the summary of planning projections approach to identify existing and foreseeable cumulative impacts, based on local jurisdiction general plans and prior project experience in the action area (see Figure 18-1 for extent of action area). Analysis addressed both types of cumulative effects identified by CEQ: those that represent the combined effect of activities occurring under more than one action, and those resulting solely from the additive effect of repeated activities under the proposed action. Both types of effects were analyzed based on professional judgment in light of current standards of care specific to each resource topic. Consistent with the State’s CEQA Guidelines and CEQ’s cumulative impacts guidance, analysis focused on aspects of regional cumulative effects to which the proposed action has the potential to contribute; cumulative effects to which the proposed action would not contribute are not discussed or analyzed in detail.

For **resources known to be subject to a regional cumulative impact** independent of the proposed action, the effects of the proposed action were analyzed as they would combine with the effects of other projects to contribute to the larger cumulative effect (“multi-project analysis”). For most resources, separate analysis of the proposed action’s additive effects was not necessary in these cases, because identifying the proposed action’s contribution to the larger, multi-project cumulative effect included consideration of the additive effects of repeated activities it would entail.

For **resources not believed to be subject to an existing regional cumulative effect**, separate analysis of the proposed action’s additive effects was necessary to meet the requirement to evaluate whether repeated activities under the same program would result in a cumulative effect. This requirement is particularly important because the proposed action would have a 30-year lifespan and would entail numerous repeated activities over that period.

The first step in analyzing cumulative effects for the proposed action was to identify, for each resource analyzed in this EIS/EIR, whether a regional

Note that the action area was defined to include all directly affected lands and a substantial additional buffer to ensure that indirect effects on all resources could be thoroughly analyzed. However, only a small percentage of the lands within the action area boundary would be subject to the O&M and minor construction enabled under the proposed action. O&M activities would be limited to existing PG&E rights-of-way and immediately adjacent lands. New minor construction projects could require the acquisition of areas currently outside PG&E's rights-of-way, but would also be very restricted in extent.



**Figure 18-1**  
**Extent of Action Area—Area of Cumulative Effects Analysis**

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cumulative effect exists independent of the proposed project. The need to analyze additive effects under the proposed action was then assessed. Table 18-1 summarizes this process and shows the types of analyses needed for the proposed action's potential contribution to cumulative effects, by resource topic.

**Table 18-1.** Summary of Cumulative Effects Analyses Needed for the Proposed Action

Resource Topic	Is There a Regional Cumulative Impact?	Analyze Proposed Action's Additive Effects Separately?
Land Use and Planning	None identified. Land use in the action area is evolving as San Joaquin Valley urban centers expand, but because growth centers on existing developed areas, it is primarily if not exclusively taking place as planned growth guided by General and Specific Plans.	The areas affected by repeated O&M activities enabled under the proposed action would be limited to ROWs and immediately adjacent lands. Because O&M is inherently focused on use and maintenance of these existing facilities, it would not result in any additive cumulative effect on land use. Minor construction projects and establishment of new preserves could both affect land use planning, but new facilities and compensation lands would be distributed throughout the action area and thus would not result in additive cumulative effects on any one location or vicinity. Because the size of new facilities would be comparatively small, additive effects would be less than significant over the action area as a whole. No further analysis is warranted.
Agricultural Resources	Yes; multi-project analysis required.	No.
Biological Resources	Yes; multi-project analysis required.	No.
Aesthetics	The action area includes undeveloped lands, agricultural areas, small communities, and rapidly growing urban centers such as Stockton, Modesto, Bakersfield, and Fresno. Because of its geographic diversity, the action area is extremely heterogeneous in terms of the character and quality of views it offers. Localized cumulative impacts on aesthetic resources are considered to exist in areas where agricultural or open space is undergoing progressive urbanization, and along transit corridors where multiple unrelated built elements disrupt or intrude on rural or agricultural views. However, much of the action area offers high quality views of open rural and agricultural land, minimally affected if at all by cumulative effects of urbanization. The overall visual character and quality of action area views does not constitute a regionwide cumulative impact. No multi-project analysis is needed.	The areas affected by repeated O&M activities enabled under the proposed action would be limited to ROWs and immediately adjacent lands. Because O&M would focus on use and maintenance of existing facilities, repeated activities would not substantially alter the existing visual character of these alignments over the long term. No significant additive cumulative effect is anticipated, and further analysis is not warranted.  Minor construction projects could alter visual character and/or quality in their vicinity. However, these projects would be located throughout the action area and thus would not result in additive effects on any one location or vicinity. Because it is not possible to predict the exact siting or nature of minor construction projects at this time, analysis of their additive effect, if any, on regionwide visual character would be speculative. No further analysis is required.
Geology and Soils	Although many projects within the action area are subject to a similar range of geologic hazards and constraints, these factors are typically addressed through a combination of engineering design and geotechnical mitigation specific to	No.

Resource Topic	Is There a Regional Cumulative Impact?	Analyze Proposed Action's Additive Effects Separately?
	<p>each project's needs, as required by applicable state and local codes. Geologic factors are not typically considered to create a cumulative impact except in the case of multiple similar projects within a restricted geologic area where hazards cannot be mitigated with confidence.</p> <p>However, accelerating development in the San Joaquin Valley has contributed to progressive loss and unavailability of topsoil resources, representing a significant cumulative impact in parts of the action area. Focused analysis of this topic is required.</p>	
Water Resources	Yes; multi-project analysis required.	No.
Cultural Resources	Yes; multi-project analysis required.	No.
Paleontological Resources	None identified.	Yes.
Transportation and Circulation	<p>Cumulative traffic concerns have been identified in parts of the action area, particularly in urban areas and along heavily traveled corridors such as parts of I-5. However, other parts of the action area, including rural areas and recently developed areas where roadway infrastructure is adequate for current and projected demand, are not subject to cumulative traffic impacts. Because traffic conditions are so diverse, a regional (action area-wide) cumulative impact is not considered to exist. No multi-project analysis is needed.</p>	<p>Both O&amp;M and minor construction activities would be distributed across the nine action area counties. Because of their wide geographic distribution and short-term, intermittent nature, neither O&amp;M nor minor construction is expected to result in a significant additive cumulative effect on vehicular traffic or other transportation. No further analysis is warranted.</p>
Noise and Vibration	<p>The action area includes a diversity of land uses ranging from urban to agricultural and rural. Urban and rapidly developing areas are typically subject to cumulative noise impacts, while agricultural and rural areas are much less likely to be so impacted. Because of the diversity of noise environments in the action area, a regional (action area-wide) cumulative impact is not considered to exist. No multi-project analysis is needed.</p>	<p>As identified above, both O&amp;M and minor construction activities would be distributed across the nine action area counties. Because of their wide geographic distribution and short-term, intermittent nature, neither O&amp;M nor minor construction is expected to result in a significant additive cumulative effect on noise conditions. No further analysis is warranted.</p>
Air Quality	Yes; multi-project analysis required.	No.
Public Health and Environmental Hazards	<p>The action area has supported a broad range of land uses that employ hazardous materials; as of 2004, more than 7,000 sites with confirmed hazardous materials contamination have been identified in the nine action area counties. Contaminated sites are typically concentrated in areas with a history of specific land uses (e.g., industry and manufacturing, defense-related activities, rail and highway uses). Such areas are considered to be subject to localized cumulative impacts, while other parts of the action area are comparatively unimpacted. Thus, it is difficult to generalize appropriately across the entire action area, and no regional (action area-wide) cumulative impact is considered to exist. No</p>	Yes.



Resource Topic	Is There a Regional Cumulative Impact?	Analyze Proposed Action's Additive Effects Separately?
	multi-project analysis is needed.	
Recreation	None identified.	The most likely avenues through which the proposed action would affect recreational uses or opportunities in the action area are construction of new facilities, and establishment of new preserves for habitat compensation. Both of these types of effects are expected to occur in discrete, widely separated locations throughout the action areas, and the extent of effects would be small, so no significant additive cumulative effect on recreation is anticipated. No further analysis is warranted.
Socioeconomics	None identified.	No. As discussed in Chapter 16, the socioeconomic effects of the proposed action and action alternatives are expected to be minimal. The analysis presented in Chapter 16 considered effects over the entire action area throughout the 30-year permit term; no further analysis of additive effects is warranted.
Environmental Justice	None identified.	No. As discussed in Chapter 17, the proposed action's incremental effects related to environmental justice are expected to be minimal. The analysis presented in Chapter 17 considered effects over the entire action area throughout the 30-year permit term; no further analysis of additive effects is warranted.

Based on the assessment summarized in Table 18-1, regional multi-project analyses were prepared for the following topics.

- Agricultural resources.
- Biological resources.
- Topsoil resources.
- Water resources.
- Cultural resources.
- Air quality.

A separate analysis of the proposed action's additive effects was prepared for

- paleontological resources, and
- hazardous materials.

# Proposed Action's Contribution to Cumulative Effects

## Effects in Context of Multiple Undertakings

### Agricultural Resources

The principal cumulative effects concern relative to agricultural resources is conversion of agricultural land to nonagricultural uses. As discussed in Chapter 4 (*Agricultural Resources*), California is the nation's most populous and fastest-growing state. With that population growth has come an increasing pressure toward development of previously rural and agricultural areas, resulting in conversion of agricultural lands to residential, commercial, and industrial uses—over the period 1998–2000 alone, more than 21,000 acres of agricultural land in the action area was converted to nonagricultural use, representing about half of the statewide total for agricultural land conversions during that period (California Department of Conservation 2002). Agricultural land conversion thus represents a significant cumulative impact in the action area.

The proposed action would result in conversion of small areas of agricultural land to nonagricultural use to support installation of new facilities, expansion of existing facilities, and acquisition of new ROWs. PG&E estimates the total permanent conversion loss of agricultural fields at a maximum of 2 acres per year, and the total permanent loss of grassland, including but not limited to grassland that supports grazing use and is thus considered agricultural land, at a maximum of 1 acre per year. This translates to a total maximum conversion of 3 acres per year, or a maximum of 90 acres over the lifespan of the proposed action. Regionwide, agricultural conversion is expected to continue over the lifespan of the proposed action, and the rate of conversion could accelerate somewhat as development proceeds. However, **the maximum 90-acre loss as a result of the proposed action represents a small area and would not constitute a cumulatively considerable contribution to the conversion of agricultural land to nonagricultural use, either in the action area, or in the state as a whole.**

Some additional land could be acquired to support habitat mitigation under the proposed HCP, although, as discussed in the incremental analysis in Chapter 4 (*Agricultural Resources*), this would affect only grazing lands; lands would only be acquired from willing sellers; and most lands identified for compensation use would likely continue to be grazed after acquisition, and thus would not undergo a change in uses. Moreover, in contrast to a residential development or other similar project, the proposed action would not result in the loss or conversion of agricultural land to urban or other developed use; under the proposed action, any grasslands acquired for mitigation use would be permanently protected from urban development and managed to benefit biological resources in perpetuity. Because of the commitment to manage mitigation lands for biological benefit, the physical attributes of unirrigated grassland that may be acquired under the proposed action would not be lost or otherwise altered. Consequently, habitat

mitigation is not expected to result in any significant *physical* impact on agricultural land on an incremental basis, **nor would habitat mitigation result in a cumulatively considerable contribution to regional agricultural conversion impacts.**

## Biological Resources

Like much of the rest of California, the action area is subject to significant cumulative impacts related to loss and degradation of habitat as a result of land use practices over approximately the past 150 years. Conversion to agricultural use has been a primary factor in loss of the action area's native grassland, scrub, and riparian/wetland habitats. Additional losses have resulted from accelerating urbanization in recent decades. The action area's aquatic habitats have been impacted by various types of pollutants, including agricultural and petrochemicals; pollutants delivered via urban runoff; and increased sediment delivery resulting from ground disturbance for construction.

In addition, significant cumulative impacts on individual plant and wildlife species are considered to exist where species have been identified as qualifying for federal or state special status. This applies to a number of plant and wildlife species that are known to occur or may occur in the action area, listed in Tables 5-1, 5-2, 5-3, and 5-4.

As discussed in Chapter 2 (*Proposed Action and Alternatives*) and Chapter 5 (*Biological Resources*), O&M activities and minor construction are expected to result in the permanent loss of up to 1 acre and temporary disturbance of up to 196 acres of natural vegetation and the permanent loss of approximately 0.1 acre and temporary disturbance of approximately 0.5 acre of vernal pool habitat annually over the 30-year life of the proposed action. The habitat type subject to the greatest disruption is expected to be grassland, with a net disturbance of up to 105 acres per year. Through the HCP, PG&E proposes to avoid and minimize effects on these natural habitats to the extent practicable. As Chapter 2 identifies, some permanent loss is nonetheless likely to result from O&M and minor construction. Aquatic habitats could also be further degraded as a result of inchannel construction activities.

Accordingly, the proposed HCP further provides for acquisition and management of habitat to compensate for any unavoidable disturbance or loss. Compensation would be arranged in advance, based on a 5-year planning cycle, and PG&E would track actual impact acreages versus compensation acreages acquired as O&M activities proceed. If potential compensation deficits are identified during any planning cycle, they would be addressed by adjusting requirements for the following cycle and/or by implementing "early" compensation purchases; note that compensation for impacts on extremely rare plant species would be required within 2 years of impact. Thus, with the exception of very rare plant species, overall terrestrial habitat compensation is anticipated to outpace actual loss and disturbance over the long term. Potential impacts on aquatic habitat as a result of inchannel work would be avoided or minimized through provisions of the master streambed agreement included as a component of the proposed action, as

discussed in Impact BIO7 in Chapter 5. **With these protections and compensation mechanisms in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to regional loss of natural habitats, and the proposed HCP is expected to result in a net long-term benefit with regard to cumulative regional habitat loss. It would also result in corollary benefits to common and special-status wildlife using the habitats preserved and protected.**

In addition, the HCP provides species-specific measures that augment PG&E's biological resources programs to reduce and compensate for disturbance, injury, and mortality of 65 special-status plant and wildlife species (see Tables 5-1 and 5-3). **With PG&E's existing programs and the HCP's additional measures and compensation requirements in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to cumulative impacts on the HCP-covered species, and the proposed HCP is expected to result in a net long-term benefit for these species.**

As discussed in Chapter 5 (*Biological Resources*), the action area may support a number of additional plant and wildlife species that are not now state- or federally listed and are not expected to be listed within the proposed 30-year HCP term and thus are not covered in the proposed HCP, but nonetheless qualify for some form of special status (see Tables 5-2 and 5-4). O&M and minor construction have some potential to result in injury, mortality, and/or loss of habitat to special-status species other than those covered by the HCP. However, based on these species' distribution and the nature of the activities that would take place under the proposed action the lead agencies have concluded that significant impacts are unlikely (see Impact BIO6 in Chapter 5), and that the proposed action would not make a cumulatively considerable contribution to impacts on these species. The following paragraphs explain this conclusion in greater detail.

Four species—the Merced Canyon shoulderband, Ciervo aegialian scarab, Dry Creek cliff strider bug, and Merced kangaroo rat—have very narrow known home ranges. As discussed in Chapter 2, PG&E's current practice is to avoid small, localized populations of special-status species where they are known to occur. Where biological screening indicates that it is warranted, species' experts are consulted to assist the company's in-house biological staff in areas where species- or site-specific avoidance measures are necessary. In addition, PG&E implements its O&M activities in a manner that avoids or minimizes effects on small, localized populations where this can be accomplished while continuing to meet CPUC's safety and other regulations; if O&M activities are required in an area used by any of these species in the future, company biologists would evaluate the potential for impact and identify appropriate site- and activity-specific avoidance or minimization measures. In light of these provisions, O&M- and minor construction-related impacts on these four highly localized species were evaluated as incrementally less than significant (see Impact BIO6 in Chapter 5), **and the contribution, if any, to regional impacts on these species would not be cumulatively considerable.**

Nine species—foothill yellow-legged frog, silvery legless lizard, two-striped garter snake, snowy egret (rookeries), great blue heron (rookeries), yellow rail, western snowy plover, LeConte's thrasher, and gray vireo—are known to occupy a small portion of the action area and have a broader distribution outside the action area. All nine of these species would be substantially protected during both new minor construction and ongoing O&M by PG&E's biological resources program, described under *PG&E's Existing Environmental Programs and Practices* in Chapter 2; impacts on birds would also be reduced by measures included in the company's Bird Protection Program (included as an appendix to the HCP; see Appendix B of this EIS/EIR). Additional protection would be afforded by the HCP's AMMs for species with similar habitat requirements. For example, foothill yellow-legged frog would benefit from AMM 17 (general protection for amphibian and reptile habitat) and possibly also from AMM 16 (protection for giant garter snake and California red-legged frog; two-striped garter snake would benefit from AMM 16, yellow rail would likely benefit to some extent from measures protecting wetland and grassland habitats; and the great blue heron and snowy egret would derive some benefit from protection of riparian habitat under AMM 26 (for riparian brush rabbit) and AMM 27 (for riparian woodrat). Impacts on heron and egret rookeries would be further minimized by PG&E's continuing compliance with protections for nesting birds embodied in Section 3503 of the California Fish and Game Code. In light of these PG&E's existing biological resources program and Bird Protection Program, measures included in the proposed HCP, and continued compliance with Section 3503 of the Fish and Game Code, **the proposed action is not expected to make a cumulatively considerable contribution to regional impacts on these species.**

The remaining 18 species listed in Table 5-4 have wide distributions that encompass much or all of the action area and in many cases extend outside the action area as well. These species include California linderiella, Hopping's blister beetle, Moestan blister beetle, Molestan blister beetle, Morrison's blister beetle, western spadefoot, western pond turtle, California horned lizard, San Joaquin whipsnake, northern harrier, Cooper's hawk, long-eared owl, California horned lark, pale Townsend's big-eared bat, San Joaquin pocket mouse, short-nosed kangaroo rat, Tulare grasshopper mouse, and American badger. Impacts of O&M activities on these species' habitat would be localized and temporary; minor construction, although it would result in permanent effects, would be even more areally restricted. Population-level impacts on any of these species are unlikely in light of the small area of habitat affected annually and over the permit term. With the existing biological resources program continuing in force under the proposed action, impacts would be effectively addressed on an activity by activity basis. Some species would also benefit by implementation of the HCP's AMMs for covered species with similar habitat requirements. For instance, linderiella would be protected by AMM 15 (vernal pool protection); western spadefoot and western pond turtle would benefit from protection of wetland and riparian habitat under AMMs 6 and 7, from protection of covered amphibian and reptile habitat under AMM 17, and from protection of California red-legged frog and giant garter snake habitat under AMM 16; and northern harrier, San Joaquin pocket mouse, short-nosed kangaroo rat, Tulare grasshopper mouse, and probably also American badger would benefit from grassland protection and

compensation. Consequently, the proposed action's impacts on these 18 species are also expected to be **less than cumulatively considerable**.

**In summary, with PG&E's existing biological resources program and the HCP's additional measures and compensation requirements in place, O&M and minor construction under the proposed action are not expected to make a cumulatively considerable contribution to cumulative impacts on "other" special status species in the action area—those not covered in the HCP. Moreover, the HCP would result in a net long-term benefits to noncovered special-status species that use the habitats protected and conserved under the HCP.**

## Geology and Soils

Analysis of the proposed action's contribution to cumulative impacts related to geology and soils focuses on topsoil resources, as discussed in Table 18-1 above.

Accelerating development in the San Joaquin Valley over recent decades has contributed to progressive unavailability and loss of topsoil resources, representing a significant cumulative impact in parts of the action area. Areas where topsoil loss has been particularly important include the fringes and suburbs of rapidly expanding communities such as Fresno, Clovis, Bakersfield, Modesto, and the greater Sacramento area.

Loss of topsoil resources is a concern for two reasons. First, topsoil has intrinsic value as part of a healthy ecosystem, recycling nutrients, supporting vegetation, and capturing and to some extent filtering incident precipitation. Topsoil is also essential to support agriculture, so it has economic importance in the still largely agricultural San Joaquin Valley. From a cumulative impacts perspective, the loss of topsoil as an agricultural resource is related to concerns regarding loss and conversion of agricultural lands, but is distinct in that it focuses specifically on the physical resource itself, rather than the broader perspective of an area's existing and planned land uses.

As discussed in Chapter 7 (*Geology and Soils*), O&M activities enabled by the proposed action would be conducted in or immediately adjacent to existing PG&E ROWs, which have undergone varying degrees of disturbance and thus do not represent an important topsoil resource. As a result, O&M activities are not expected to make a cumulatively considerable contribution to loss of topsoil resources in the action area.

Minor construction projects could be sited outside existing ROWs, and could have footprints of as much as several acres, so topsoil would likely be lost as a result of at least some of these activities. Most if not all new facilities would be constructed near existing infrastructure, and some of the sites would likely already be disturbed, offering little topsoil value. Construction on sites contiguous with open space or agricultural land could result in loss of undisturbed topsoil resources. Overall, **losses** would be small enough that they are evaluated as less than significant on an activity-by-activity basis (see *Impact*

*GEO7* in Chapter 7), and they are likewise expected to fall short of the cumulatively considerable threshold.

## Water Resources

Water resources in the action area are subject to several cumulative effects: progressive modification of natural drainage patterns in much of the nine-county region; groundwater overdraft, particularly in the southern and western San Joaquin Valley and Delta region; degradation of surface water quality in a number of drainage systems throughout the action area; and localized degradation of groundwater quality. The proposed action would not result in substantial drainage modifications and thus is not expected to make a considerable contribution to cumulative drainage modification impacts, nor would it alter patterns of groundwater use or result in new demand for groundwater. This analysis therefore focuses on water quality issues.

### Existing Surface Water Quality Concerns in Action Area

As shown discussed in Chapter 8 (*Water Resources*) and shown in Table 18-2, the quality of surface waters in the action area varies widely. The quality of many water bodies is adequate for all designated beneficial uses, while others have been identified by the SWRCB as impaired as a result of various types of contamination. Identified impairments are considered to constitute significant cumulative impacts on water quality; they are indicated by gray shading on Table 18-2.

**Table 18-2.** Water Quality in Action Area's Principal Surface Water Bodies

Surface Water Body	Identified Impairment(s)	Source(s)
<i>Sacramento River Basin</i>		
Sacramento River	Unknown toxicity	Unknown
Pit River	Diazinon	Agriculture
	Mercury	Former resource extraction activities
	Nutrients; organic impairments/low dissolved oxygen content; elevated temperature	All from agricultural/grazing uses
Feather River	Diazinon	Agriculture, urban runoff
	Group A pesticides	Agriculture
	Mercury	Former resource extraction activities
	Unknown toxicity	Unknown
Yuba River	<i>None identified as of 2002–2003</i>	—
Bear River	Diazinon	Agriculture

Surface Water Body	Identified Impairment(s)	Source(s)
American River, Lower	Mercury	Resource extraction
	Mercury	Resource extraction
	Unknown toxicity	Unknown
Cottonwood Creek	<i>None identified as of 2002–2003</i>	—
Stony Creek	<i>None identified as of 2002–2003</i>	—
Cache Creek, Lower	Mercury	Resource extraction
	Unknown toxicity	Unknown
Putah Creek, Lower	Mercury	Resource extraction/unknown
Goose Lake	<i>None identified as of 2002–2003</i>	—
Shasta Lake	Cadmium, copper, zinc	Resource extraction
Lake Oroville	<i>None identified as of 2002–2003</i>	—
Folsom Lake	<i>None identified as of 2002–2003</i>	—
Clear Lake	Mercury	Resource extraction
	Nutrients	Unknown
Lake Berryessa	Mercury	Resource extraction

***San Joaquin River Basin***

San Joaquin River	Boron, chlopyrifos, DDT, diazinon, electrical conductivity, Group A pesticides	Agriculture
	Mercury	Resource extraction
	Unknown toxicity	Unknown
Cosumnes River	<i>None identified as of 2002–2003</i>	—
Mokelumne River, Lower	Copper, zinc	Resource extraction
Calaveras River, Lower	Diazinon, organic enrichment/low dissolved oxygen content, pathogens	Urban runoff/storm sewers
Stanislaus River	Diazinon, Group A pesticides	Agriculture
	Mercury	Resource extraction
	Unknown toxicity	Unknown
Tuolumne River, Lower	Diazinon, Group A pesticides	Agriculture
	Unknown toxicity	Unknown
Merced River, Lower	Chlorpyrifos, diazinon, Group A pesticides	Agriculture
Chowchilla River	<i>None identified as of 2002–2003</i>	—
Fresno River	<i>None identified as of 2002–2003</i>	—
Lake Pardee	<i>None identified as of 2002–2003</i>	—



Surface Water Body	Identified Impairment(s)	Source(s)
New Hogan Reservoir	<i>None identified as of 2002–2003</i>	—
Millerton Lake	<i>None identified as of 2002–2003</i>	—
Don Pedro Lake	Mercury	Resource extraction
New Melones Reservoir	<i>None identified as of 2002–2003</i>	—

Note: Impairments may vary by reach; information in this table is summarized across all reaches except as noted. Gray highlight indicates water bodies with significant cumulative impact on water quality.

Source: State Water Resources Control Board 2004.

## Groundwater Quality Concerns in Action Area

As discussed in Chapter 8 (*Water Resources*), groundwater quality in the Sacramento River hydrologic region<sup>1</sup> is generally excellent. In water quality tests performed between 1994 and 2000 on samples from some 1,300 public water supply wells representing more than half of the region's basins and subbasins, 95% of the samples tested met the state's primary MCLs for drinking water. However, areas of contamination in excess of MCLs or other applicable standards have been identified, and where applicable standards are exceeded, a significant cumulative impact is considered to exist. Contaminants include heavy metals, radioactivity, nitrates, pesticides, and volatile organic compounds (VOCs). Some of the heavy metals, salts, and radioactivity may be of natural (non-anthropogenic) origin; naturally high salinities and dissolved solids levels occur in groundwater at the north end of the Sacramento Valley, along the margins of the Valley, and in the Sutter Buttes area, and naturally occurring radioactivity and heavy metals are present in groundwater in parts of the Sierran foothills. Anthropogenic contaminants are most commonly related to leachate from improperly designed septic systems (California Department of Water Resources 2003); additional sources include agricultural and industrial activities.

Groundwater quality in most of the San Joaquin River hydrologic region is suitable for designated beneficial uses, although it is more impacted than in the northern portion of the action area. In water quality tests performed between 1994 and 2000 on samples from 689 public water supply wells representing 10 of the region's 11 basins and subbasins, 76% of the samples tested met the state's primary MCLs for drinking water. Contamination in excess of applicable standards is more common in the San Joaquin River hydrologic region than in the Sacramento River region, and, as identified above, where applicable standards are exceeded, a significant cumulative impact exists. Contaminants include aluminum, arsenic, manganese, iron, dissolved solids, radioactivity, nitrate,

<sup>1</sup> As discussed in Chapter 8 (*Water Resources*), the northern portion of the action area is within the Sacramento River and San Joaquin River Basins. The southern portion of the action area is within the Tulare Basin, the interior-drainage basin that occupies the southern San Joaquin Valley and is recognized as hydraulically and hydrologically separate from the San Joaquin River Basin proper. The aquifer system in the action area comprises the subsurface portion of four distinct hydrologic subregions: the Sacramento Valley (Sacramento River Basin), Sacramento–San Joaquin Delta region, San Joaquin River Basin, and Tulare Basin. See Chapter 8 (*Water Resources*) for additional background information.

pesticides, volatile and semivolatile organic compounds (VOCs and SVOCs), boron, chloride, and DBCP (California Department of Water Resources 2003).

## Potential Contribution to Cumulative Impacts on Water Quality

### Increased Sediment Delivery

Many if not all of the O&M activities enabled under the proposed action would result in some degree of ground disturbance, with the potential to increase sediment delivery via runoff to surface water bodies. Increased sediment delivery is a potential concern because it can increase water turbidity, degrade habitat quality for some native species, alter stream function, and increase infrastructure and channel maintenance costs.

As discussed in Chapter 2 (*Proposed Action and Alternatives*), PG&E intends to continue the company's existing program of erosion and sediment control measures, and will also continue to comply with requirements of the federal Clean Water Act, including preparation of a SWPPP for activities with the potential to disturb more than 1 acre. With these measures in place, sediment generated by individual activities should be effectively reduced; however, erosion and sediment movement would not be entirely eliminated, and sediment delivery could be locally and temporarily increased. The potential for increases would be greater with minor construction because of the increased extent and duration of disturbance.

Excess sediment load delivered to area waterways would primarily be confined to the fine sediment fraction. Fine sediments may be carried long distances in suspension but would eventually drop out of transport in backwaters or when river or stream drainage empties into standing water. Because the duration of increased delivery would be temporary, sediment from different sites would be delivered in discrete pulses, and one pulse would be expected to move through the local system and settle out of transport before the next arrived. **Thus, from a short-term water quality perspective, the effects of increased sediment loading as a result of onland work are not expected to be cumulatively considerable.**

Depending on the nature and location of O&M and minor construction, and the degree of success achieved by erosion control measures, the net contribution of sediment to area waterways over the 30-year permit term could vary from almost nil to more substantial. However, in light of the continuing protection that would be afforded by PG&E's water quality program and the requirements of the federal Clean Water Act, **sediment generated by O&M and minor construction is not expected to result in a cumulatively considerable contribution to regional water quality degradation in impaired systems over the permit term, nor is the likely level of increase in sediment delivery expected to create a new, significant additive cumulative effect on systems not already identified as impaired.**

Inchannel work could also increase sediment mobility and water turbidity, with some potential for adverse effects on water quality. However, sediment containment measures would continue to be used for all activities under the proposed action, as described in Chapter 2 (*Proposed Action and Alternatives*). With these measures in place, sediment generated by individual activities should be effectively reduced but would not be entirely eliminated; on some job sites, sediment mobility could be locally and temporarily increased.

Inchannel work is strictly regulated under Section 1602 of the California Fish and Game Code; as described in Chapter 2 and in Impact WR8 in Chapter 8 (*Water Resources*), the proposed action would entail development of a master streambed alteration agreement that would include specific commitments and measures to protect water quality during inchannel work. Moreover, as discussed in Chapter 8 (see *Impact WR8*), almost any construction below the ordinary high water mark of any stream or wetland would require PG&E either to obtain an individual permit from the USACE under CWA Section 404, or to qualify for an existing Section 404 Nationwide Permit. Compliance with CWA Section 404 could involve a further review of water quality issues. In light of existing BMPs and the additional protection provided by the master streambed alteration agreement and the CWA review processes, water quality impacts associated with individual activities are expected to be minor. The long-term additive effect of inchannel work, and the proposed action's contribution to regional water quality concerns, are also expected to be minor. **No cumulatively considerable contribution is expected as a result of inchannel work, nor is the likely level of increase expected to create a significant additive cumulative effect on systems not already identified as impaired.**

### Spills and Releases

As discussed in Chapter 14 (*Public Health and Environmental Hazards*), various O&M and minor construction activities would entail handling and use of a wide variety of substances that could degrade surface- and/or groundwater quality in the event of a spill, including fuels, lubricants, epoxy and other adhesives, paints, waterproofing compounds, asphalt paving, and herbicides (see additional discussion in *Hazardous Materials* below). In light of PG&E's existing program of training and BMPs for water quality protection, hazardous materials handling, and herbicide use, and the additional protection provided by the SWPPP requirement, water quality impacts related to spills/releases of hazardous materials are expected to be incrementally less than significant, as discussed in Chapter 8. **The potential for a cumulatively considerable contribution to regional water quality degradation in impaired systems is also considered minor, and would be further reduced by regulatory requirements for cleanup and remediation of hazardous materials spills. The likely additive effect is not expected to represent a significant cumulative impact in systems not already identified as impaired.**

## Cultural Resources

Throughout California, the Native American cultural legacy, including culturally important sites and traditional cultural practices, has been substantially affected

by land management practices over the past century and a half. The nine counties of the action area are no exception, and a significant cumulative impact is considered to exist with regard to loss of cultural resources and cultural heritage. Because they would require ground disturbance, O&M and, particularly, minor construction activities enabled under the proposed action would have some potential to contribute to this loss.

As discussed in Chapter 9 (*Cultural Resources*), the principal concern is that ground disturbance required for some O&M activities and for construction of new infrastructure would have the potential to damage or destroy buried cultural materials. O&M activities disturb comparatively small footprints, and primarily affect ROW corridors that have already been disturbed, but there is still some potential that additional disturbance could adversely affect unknown buried resources. However, as Chapter 2 describes, PG&E intends to continue its existing program of cultural resources BMPs, and would also continue to comply with all federal and state regulations for the protection of cultural resources. These include specific procedures to minimize damage in the event that unknown buried resources are discovered during ground disturbing activities. With these regulatory safeguards and PG&E's additional measures in place, **O&M activities are not expected to result in a cumulatively considerable contribution to regional loss of cultural resources, nor are they considered likely to create an independent, additive cumulative effect in excess of that already existing on PG&E's ROWs.** New construction would require cultural resources studies in advance of ground disturbance. Any potential adverse impacts would be subject to avoidance and/or mitigation measures consistent with PG&E's existing cultural resources commitments. Consequently, although there is some potential that minor construction activities under the proposed action could contribute to cumulative loss of cultural resources in the action area, the contribution would be avoided, minimized, and mitigated to the extent practicable, and **the lead agencies have determined that any residual effect would not represent a cumulatively considerable contribution, nor would it result in a significant new additive cumulative effect.**

## Air Quality

As discussed in Chapter 13 (*Air Quality*), most of the action area is located in the San Joaquin Air Basin and is under the jurisdiction of the SJVUAPCD. The remainder is in the Mariposa County Air Basin and is under the jurisdiction of the MCAPCD. Table 18-3 summarizes 2004 attainment status for both portions of the action area. Note that nonattainment status (highlighted in gray) represents a significant cumulative impact on air quality.

**Table 18-3.** Summary of 2004 Attainment Status for Action Area<sup>2</sup>

Pollutant	SJVUACPD		MCAPCD	
	State	Federal	State	Federal
1-hour O <sub>3</sub>	Severe nonattainment	Extreme nonattainment	Nonattainment	Unclassified/attainment
8-hour O <sub>3</sub>	NA	Serious nonattainment	NA	Nonattainment
PM10	Nonattainment	Serious nonattainment	Yosemite National Park—nonattainment	Unclassified/attainment
			Rest of County—unclassified	
CO	Attainment	Fresno and Stockton Urbanized Areas—moderate maintenance	Unclassified	Unclassified/attainment

Source: California Air Resources Board 2004.

As Table 18-3 shows, most of the action area is in nonattainment for federal and/or state ozone and PM10 standards. Significant cumulative impacts are thus considered to exist for the following.

- Ozone levels in all parts of the action area.
- PM10 levels in the San Joaquin Air Basin and Yosemite National Park.

Because existing cumulative impacts have been identified for only two of the regulated “criteria pollutants,” analysis of cumulative impacts on air quality must address two independent but related issues:

1. the potential for emissions of ozone precursors and PM10 under the proposed action to constitute a cumulatively considerable contribution to existing impacts; and
2. the potential for emissions of other pollutants during repeated activities under the proposed action to create a new, additive cumulative impact for pollutants other than ozone precursors and PM10.

These questions are considered separately in the following sections. Analysis focuses on O&M and minor construction, which are expected to be the only substantial sources of pollutant emissions associated with the proposed action.

### Contribution to Existing Cumulative Air Quality Impacts—Ozone and PM10

Several types of equipment routinely used in O&M and minor construction activities emit ozone precursors:

<sup>2</sup> For additional information on attainment status, please see Table 13-4.

- vehicles—including cars/trucks, light aircraft, and helicopters—used for site access and inspection patrols;
- heavy trucks used to deliver equipment and offhaul debris and excavated materials from work sites;
- heavy construction equipment, such as excavators, graders, backhoes, and compactors; and
- small power equipment such as chainsaws, walk-behind compactors, and generators.

In addition, painting and paving activities can emit ozone precursor gases. Particulate matter (fugitive dust) would be generated during ground-disturbing activities such as vegetation removal, excavation, grading, and fill placement, and by vehicles and equipment traveling on unpaved roads and offroad. Vehicle and equipment exhaust gases (“tailpipe emissions”) would also contribute a small amount of particulate matter.

As discussed in Chapter 13 (*Air Quality*), it is not possible to predict the precise numbers and types of vehicles needed or the duration and frequency of their use at this time, but it is anticipated that PG&E’s activities would continue in approximately their current manner, with the same environmental commitments and regulatory compliance protection in place. The overall activity level would likely increase somewhat over the 30-year permit term, as development proceeds and the demand for electricity and natural gas service increase. However, individual activities would continue to be short-term and intermittent. In addition, PG&E’s internal combustion and diesel equipment fleet would become cleaner overall over the long term, as older equipment obsolesces and is replaced with newer equipment.

Because individual O&M activities would continue to be relatively small-scale and short in duration, and would use progressively “cleaner” equipment over the permit term, **the lead agencies have concluded that emissions of ozone precursor gases would not exceed the cumulatively considerable threshold.**

The transition to “cleaner” gasoline- and diesel-powered equipment discussed above would also reduce the contribution of tailpipe emissions to PM10 levels over time. In addition, PG&E has committed to implementing the SJVUAPCD’s “Regulation VIII” control measures to reduce generation of fugitive dust, which would continue to reduce dust-related PM10 impacts to the extent feasible. It is not possible to eliminate PM10 generation entirely, but in light of the anticipated reduction in tailpipe particulate emissions, and particularly because PG&E has committed to implementing the SJVUAPCD’s enhanced PM10 control measures (see Table 2-2, **the proposed action’s contribution to regional particulate matter impacts is not considered to exceed the cumulatively considerable threshold, consistent with SJVUAPCD guidance.**

**In summary, the proposed action is not considered likely to make a cumulatively considerable contribution to existing impacts on ozone or particulate matter levels in the action area.**

## Potential for New, Additive Cumulative Effects on Air Quality

In addition to ozone precursors and particulate matter, the other principal pollutant likely to be generated by activities under the proposed action is carbon monoxide.

O&M and minor construction activities would generate small increases in CO levels, principally if not exclusively as a component of tailpipe emissions. Because vehicle and equipment use would be intermittent and short-term, with substantially more down time than time in operation, **additive cumulative effects over the 30-year permit term are expected to be less than significant.**

## Potential Cumulative Effects Due to Repeated Activities

### Paleontological Resources

As discussed in Chapter 10 (*Paleontological Resources*), some of the action area's geologic units have the potential to contain significant paleontological resources. Many of the activities that would be enabled by the proposed action would result in some degree of ground disturbance, and thus could damage paleontological resources if any are present. This is most likely to occur where ground disturbance is greater and occurs in previously undisturbed or little-disturbed areas—that is, during minor construction.

In most cases, activities entailing substantial ground disturbance would require preparation of a site-specific geotechnical investigation. For all activities that require preparation of a site-specific geotechnical investigation, PG&E has committed to mitigation (Measure PAL1.1) that would entail site-specific evaluation of paleontological sensitivity by a state-registered professional geologist (PG) or qualified professional paleontologist, followed by implementation of appropriate measures to avoid or minimize damage to any resources present.

In addition, if substantial fossil remains are encountered during activities other than emergency repairs during which work cannot be feasibly stopped, PG&E will implement a stop work order and have the find evaluated by a state-registered geologist (PG) or qualified professional paleontologist (Measure PAL 1.2). This would be followed by appropriate treatment, possibly including preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, and/or preparation of a report for publication describing the finds.

Finally, recognizing that it may be infeasible to implement a stop work during emergency repairs, PG&E has committed that if paleontological resources are discovered during emergency repairs, the company will ensure that they are

evaluated by a state-registered professional geologist (PG) or qualified professional paleontologist as soon as practicable following the completion of all necessary and required repair work (Measure PAL1.3). If appropriate, a qualified professional paleontologist will then develop a remedial treatment plan consistent with the prevailing standard of care for paleontological resources, for implementation by the company. The treatment plan could include any or all of the following: measures to prevent additional damage; recovery excavations; museum curation; preparation of a report documenting the find; and/or development of public outreach or educational materials or displays.

**With Mitigation Measures PAL 1.1, PAL1.2, and PAL1.3 in place, the additive effect of activities under the proposed action is not expected to constitute a significant new cumulative effect on paleontological resources.**

## Hazardous Materials

As discussed in Chapter 14 (*Public Health and Environmental Hazards*), various O&M and minor construction activities would entail handling and use of substances meeting the Title 22 definition of *hazardous materials*. For example, facilities inspections would require fuels, lubricants, and hydraulic fluid for the vehicles used to patrol PG&E infrastructure. Maintenance and repair activities would require vehicle fuels, lubricants, and hydraulic fluid for vehicles and equipment, and could also require concrete, epoxy, paints, and/or asphalt paving. Vegetation management would periodically require the use of herbicides. Minor construction activities could use any of the substances identified above for the O&M program, as well as additional paints, adhesives, waterproofing compounds, and other substances needed for specific projects. Spills or releases of any of these substances could result in localized contamination and could also contribute to degradation of surface- and groundwater quality (see related discussion in *Water Quality* above).

As described in Chapter 2 (*Proposed Action and Alternatives*), PG&E complies with all applicable state and federal laws, regulations, and requirements pertaining to hazardous materials and hazardous wastes, and has an ongoing hazardous materials safety program that requires staff and contractors to follow BMPs such as

- fueling and servicing all vehicles offsite;
- to the extent practicable, avoiding or minimizing storage of hazardous substances such as paints, solvents, epoxies, etc., at the work site and in the staging area;
- storing any hazardous materials that must be kept on the work site in securely stored in closed containers located away from drainage courses, storm drains, and areas of stormwater infiltration;
- ensuring that maintenance and construction personnel have been trained in current procedures and best available technology (BAT) for spill prevention and cleanup of accidental spills;



- keeping a spill kit or kits at the worksite at all times when hazardous materials are in use, and ensuring that all personnel know how to access and use the kit(s); and
- stopping work immediately in the event of a hazardous materials spill or release, and implementing appropriate cleanup and remediation measures to protect terrestrial ecosystems, surface water quality and aquatic ecosystems, groundwater quality, and human health.

PG&E also has comprehensive BMPs in place for herbicide use.

In addition, for activities with the potential to disturb an area >1 acre, the federal Clean Water Act requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP) that includes a Spill Prevention and Response Plan (see Chapter 8, *Water Resources*). As described in Chapter 2, the Spill Prevention and Response Plan would identify the hazardous materials to be used during construction; describe measures to prevent, control, and minimize the spillage of hazardous substances; describe transport, storage, and disposal procedures for these substances; and outline procedures to be followed in case of a spill of a hazardous material. SWPPP components, including the Spill Prevention and Response Plan, are under the regulatory oversight of the Regional Water Quality Control Board with jurisdiction over the work site.

In light of PG&E's existing program of training and BMPs, and the additional protection provided by the SWPPP requirement, impacts related to spills/releases of hazardous materials are expected to be incrementally less than significant, as discussed in Chapter 14. To create an additive cumulative effect, multiple spills or releases would need to occur in the same area or in hydrologically connected areas. This is considered unlikely, but could occur because ROWs represent areas where similar activities are repeated over the long term. Thus there is some, probably minor, potential for additive cumulative impacts related hazardous materials use along PG&E's ROW corridors. **Because of regulatory clean-up and remediation requirements, the additive cumulative effect, if any, is not expected to be significant over the long-term.**

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